Tube, Use of a Plastic Bag and Process for Producing a Tube

The invention relates to a tube and the use of a plastic bag with a film material of plastic which forms one face wall and two side walls of the tube.

Resealable bags for holding liquids or pastes are generally made of plastic material with very thin walls. These bags are therefore very unstable and flexible. Therefore they are not suited as tubes.

In tubes the requirement is especially that they can be set up with the sealing cap pointed downward. Here the danger is that the tube will tip over when the film material deforms under the weight of the contents of the tube.

The object of the invention is mainly to make the tube such that the above described danger of tipping over, when the tube is placed as indicated on the sealing cap, is reduced.

The object is achieved as claimed in the independent claims. Advantageously the film material is a laminate which has at least one 60 to 200 micron thick inner seal layer of polyolefin and a 10 to 25 micron thick outside layer of polyester, the strip-shaped side edge sections each have a width of at least 6.5% of the total width of the side walls, but in any case are at least 4 mm wide.

The side walls are joined flat to another along two strip-shaped side edge sections and along one strip-shaped end edge section and are provided with a shoulder piece which is stiff compared to the film material and which has a sealable outlet connection piece and a flange which is attached to the face wall.

Advantageously such a simple bag construction with bag material can be modified in the simplest way so that a tube is formed.

Embodiments of the invention are detailed below.

Figure 1 shows a side view of a bag tube,

Figure 2 shows a section along line 2-2 in Figure 1 and

Figure 3 shows on a larger scale a cross section through the film material of the bag tube, for example in the area of the circle A in Figure 2.

The bag tube which is shown in Figures 1 and 2 has two side walls 11 and 12 and one face wall 13 which are formed by a piece of film material of plastic. The film material is preferably thin, light, and flexible. As claimed in the invention it is mainly a laminate with an inner seal layer 14 (Figure 3) with a thickness d_1 of 60 to 200 microns, and with an outside layer 15 with a thickness d_2 of 10 to 25 microns. The inner seal layer 14 consists of a polyolefin, preferably polypropylene, polyethylene or a mixed polymer. It can also consist of several layers of different polyolefins. The outside layer 15 consists of polyester, preferably polyethylene terephthalate or polyethylene

napththalate or a mixed polymer of for example 90% to 95% PET and 10% to 5% PEN. Between the inner seal layer 14 and the outside layer 15 there can feasibly be a barrier layer 16. The barrier layer 16 can consist for example of aluminum with a thickness d_3 from 7 to 12 microns or of para-aramide (especially Kevlar).

The two side walls 11 and 12 are tightly connected flat to one another along the two strip-shaped side edge sections 17 and 18 and along one end edge section 19, especially welded. The width B of the side walls 11, 12 in the embodiment is roughly 100 mm each. The side edge sections 17 and 18 each have a width b which is 7% in the embodiment, but generally roughly 6.5 % to 10% of the width B of the side walls 11, 12. For smaller tubes the width b is at least 4 mm. The width b of the weld seams of the two side edge sections 17, 18 thus optimally ensures significant stiffening of the tube body.

A shoulder piece which has a closable opening in the form of an outlet connection piece 20 is attached to the end wall 13. The outlet connection piece 20 is shown closed with a screw cap 21. From the outlet connection piece 20 a flange 22 proceeds which adjoins the face wall 13 on the inside and is attached tightly terminating it, preferably welded tight. The flange 22 on the edges of the face wall 13 has two angled clips 23 and 24 which adjoin the middle areas of the side walls 11 and 12 and which run parallel to the side walls 11 and 12. The clips 23 and 24 stiffen the middle areas of the side walls 11 and 12 adjacent

to the face wall 13. At the same time they protect the film material against twisting and/or damage when the tube is held with one hand in the indicated areas of the side walls 11, 12 for screwing the sealing cap 21 on and off. The shoulder piece can otherwise have different shapes and it could also be attached externally on the face wall 13. The shoulder piece 20, 22, 23, 24 is relatively stiff compared to the film material of the side walls 11, 12 and the face wall 13.

In conjunction with stiffening by the side edge sections 17 and 18 a tube body which is stiff enough for all practical requirements is formed. An additional increase in the stability of the tube against lateral tipping arises in this embodiment by the inner boundaries of the two side edge sections 17 and 18 which face one another in the area of the face wall 13 as shown at 25 and 26 being angled to the inside towards one another. At the same time, in this way the shoulder corners - between the parts 25, 26 and the face wall 13 - are less deep, and the volume of the air enclosed at most therein when the tube is filled is smaller. Furthermore a larger part of the axial length of the outlet connection piece 19 projects downward beyond the shoulder corners. Instead of angled as shown, the inner boundaries of the side edge section 17, 18 can also be bent accordingly.

In the course of production and filling, first of all the two side walls 11 and 12 are welded together along the side edge sections 17 and 18 and the shoulder piece is attached with the

outlet connection piece 20 and the screw cap 21. Then the tube body can be filled from the end opposite the outlet connection piece 20. Thereupon the end edge section 19 is welded so that the tube is closed.

Handling of the tube is greatly facilitated by the stiffening of the tube body which is achieved by means of the wide side edge sections 17 and 18.